

Seasonality of respiratory infections.

Bezverkhniy Volodymyr Dmytrovych.

Ukraine, e-mail: bezvold@ukr.net

It is well known that there is a seasonality of respiratory infections, including influenza - that is, there are fluctuations in the incidence of various respiratory tract infections throughout the year, with an increase in the autumn-winter period.

Scientists have long been trying to explain this phenomenon with various hypotheses (competition of viruses, correlation with temperature and humidity, connection with the level of solar radiation, hypothesis about the cooling of the nasal passages, hypotheses about the effects of cold on the body, hypothesis about larger crowds of people in winter, etc.), for more details see Seasonality of respiratory infections [1].

But there is no generally accepted reason for this phenomenon. From a chemical point of view, the answer is obvious.

In the spring-summer period, that is, when the incidence of disease decreases markedly, the environment differs from the autumn-winter period for two fundamental reasons:

1. Increased solar radiation.
2. The presence in the air of a significant amount of essential oils of various plants.

These two points are quite sufficient to explain the seasonality of respiratory infections.

Let's consider point 1. Increased solar radiation is inherently a natural agent that disinfects the air. Moreover, in the spring-summer period the amount of ultraviolet component in sunlight will be much greater, as a result - an increase in the quality of air disinfection from pathogenic bacteria and viruses.

In confirmation, we recall that there is a method of disinfecting water with sunlight, when water contained in a plastic bottle (PET) is exposed to direct sunlight for a certain time (at a water temperature of 30 degrees, exposure for 6 hours).

“Solar water disinfection (SODIS)... is a method of water disinfection using only sunlight and plastic bottles. SODIS is an affordable and effective method for decentralized water purification, usually used at the household level and recommended by the World Health Organization as a practical method purification and safe storage of water at home. SODIS is now used in many developing countries. Brochures introducing this method are available in many languages...”

At a water temperature of approximately 30°C (86°F), and a solar radiation threshold of at least 500 W/m² (full spectrum), approximately 6 hours of irradiation are required to achieve the effect. This corresponds to approximately 6 hours of treatment in mid-latitudes on a sunny summer day...” [2].

I think everything is clear with point 1. Now let's move on to point 2.

Essential oils of plants are natural agents that “engage” in air disinfection in the spring and summer.

Essential oils contain hundreds of different individual chemical substances, many of which are strong antiseptics in their chemical composition (for example, various aldehydes, alcohols, amines, acids, phenols, etc.).

“...Essential oils are complex substances consisting of multicomponent mixtures containing hundreds of chemicals.

The composition of essential oils includes terpenes and terpenoids, aromatic compounds, saturated and unsaturated hydrocarbons, aldehydes, organic acids and alcohols, their esters, as well as heterocyclic compounds, amines, phenols, organic sulfides, oxides, etc.

Terpenes are the largest class of chemicals found in essential oils... the most important in essential oils are monoterpenes and sesquiterpenes. The characteristic smell of essential oils is due to these two groups of chemicals...

The composition of essential oils depends on the type of plant... The content of essential oils for various plants can range from thousandths of a percent to 5-6 %, and for some types of raw materials, for example, clove buds - about 20 %...” [3].

Thus, in the spring-summer period, when the concentration of essential oils in the air is significant, people are actually in an ocean of air filled with various disinfecting agents. We perceive these as pleasant smells.

In short, viruses and bacteria have virtually no chance - just look at the chemical composition of essential oils. And all this is in the air in decent quantities (confirmation - a pleasant smell).

Considering that in the spring-summer period there is increased solar radiation and significant amounts of essential oils in the air, reducing the incidence of various respiratory infections (including influenza) follows logically and quite justifiably, since both solar radiation and essential oils are natural disinfectants agents.

I think it is possible to build strict correlations for the reduction of morbidity depending on the concentration of essential oils in the air and the level of solar radiation.

1. The seasonality of respiratory infections. Wikipedia (ru). [Сезонность респираторных инфекций — Википедия](#)
2. Solar water disinfection. Wikipedia (ru). https://en.wikipedia.org/wiki/Solar_water_disinfection
3. Essential oil. Wikipedia (ru). https://en.wikipedia.org/wiki/Essential_oil